

PROCEEDINGS OF THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

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ORDINARY MEETING

WEDNESDAY, 3rd MAY, 1961, at 5.30 p.m. (Tea 5 p.m.)

AGENDA

1. Confirmation of the Proceedings of the Ordinary Meeting held on 5th April, 1961.
2. Recommendations of candidates for Fellowship. First reading.
3. Recommendations of candidates for Fellowship. Second reading.
4. Announcement of election of new Fellows.
5. Admission of Fellows.
6. Papers accepted for publication in the *Transactions*.
7. Exhibits.
8. Communications.

1. Dr. H. E. Hinton, F.R.S.

The respiratory systems of insect eggs.

[ABSTRACT]

The eggs of many terrestrial insects are glued to the substrate in sites where they are necessarily submerged beneath a layer of water whenever it rains heavily. To be covered with water for several hours or even days, a time that may exceed the incubation period, is not a very exceptional circumstance but is a normal hazard of their environment. It has recently been found that the eggs of many terrestrial insects breathe by means of a plastron when they are submerged beneath water. It now appears that the plastron method of respiration has been independently evolved more frequently amongst terrestrial insects than amongst aquatic insects: it is the characteristic mode of respiration of a wide variety of insect eggs. It has also recently been found that the plastron method of respiration occurs amongst the eggs of some aquatic insects, for instance, apparently all bugs of the family Nepidae.

2. Mr. L. P. Lefkovitch

Food quantity and density effects in pre-adult *Cryptolestes turcicus* (Grouv.)
(Coleoptera: Cucujidae)

[ABSTRACT]

Cryptolestes turcicus is a species frequently found in flour mills in temperate regions of the world. Rather inexplicable preliminary observations on the periods required

for isolated larvae to complete their development were investigated and it was found that as the food quantity per larva was reduced, the rate of development and the survival of larvae fell, the weight of the newly-formed adults resulting from the survivors also being reduced. These responses were shown by groups of larvae as well as by isolated individuals.

Three intermediate density factors are distinguishable, one attributed to cannibalism, one to changes in the food medium brought about by the larvae themselves and a third, which may be called disturbance. It is postulated that at least these three, acting independently or interdependently, produce the response which is recognised as being due to density.

Comparison with *C. ferrugineus* (Steph.) and *C. ugandae* Steel and Howe shows that the first species is more susceptible to harmful effects of high density than is *C. turcicus* but that the second species is rather similar to it.

NOTICES

The next meeting will be held on *Wednesday, 7th June, 1961* :

- (1) **Dr. L. Davies.**—Preliminary remarks on the structure of primitive Simuliidae and the probable affinity of the family with Chironomidae.
- (2) **Dr. R. W. Howe.**—Variation in developmental period.

Insect Polymorphism

A Symposium on the above subject will be held in the Society's Rooms on **21st–22nd September, 1961**. Fellows who wish to attend are reminded that application forms should be returned to the Registrar not later than 15th May.

PROCEEDINGS OF THE ORDINARY MEETING HELD ON 5TH APRIL, 1961

Professor G. C. VARLEY, President, in the Chair.

Present, 51 Fellows and 10 Visitors.

The minutes of the Ordinary Meeting held on 1st March were confirmed and signed by the President.

The names of the following candidates for election were read for the first time : Mr. Terence George Amos, B.Sc. ; Dr. Armando J. Farre Castel-Branco ; Mr. John Thomas Clark, M.A. ; Mr. Kunnath Gopinath ; Professor David N. Kobakhidze ; Mr. John Alan Morton ; Professor G. Madan Mohan Rao ; Mr. Richard Henry Watmough ; and Mr. Euan Cameron Young.

For the second time (taken as read) : Mr. Samuel Bankole Bernard ; Mr. John Frederick Burton ; Mr. Fernando Joseph Antony Rajanayagam Gnanarajah, B.Sc. ; Mr. Mohamed Abdel Meguid Hafiz ; Mr. Sayid Muazzam Husain ; Mr. John Anthony Richardson ; Dr. Brijesh Kumar Srivastava, M.Sc., D.Phil. ; and Mr. Fred Waterhouse.

The Secretary read the names of the following newly elected Fellows of the Society : Mr. Edward Frederick Ivor Baker, B.Sc., Agricultural Research Division, Moor Plantation, Ibadan, Nigeria ; Mr. John Balfry Davies, Ministry of Health, Kaduna, N. Nigeria ; Mr. Michael Firth, 23, New Street, Kippax, Leeds, Yorkshire ; Mr. Anthony Mervyn Gower, 1, Caroline Street, Briton Ferry, Neath, S. Wales ; Mrs. Jeelani Haq, Jania College, Malir City, Karachi 23, Pakistan ; Mr. John Farlow Lamerton, The Veterinary Research Station, Mwapwa, Tanganyika ; Mr. David Archibald Muir, B.Sc., World Health Organisation, Teuku Umar 3, Djakarta, Indonesia ; Mr. William John Norton, 8, Castle View Terrace, Ludlow, Shropshire ; Mr. William L. Peters, University of Utah, Salt Lake City, Utah, U.S.A. ; Mr. Brian Holt Riley, 36, Mill Road,

Deal, Kent; Mr. David Henry Udall, 88, Fairway Avenue, London, N.W.9; and Mr. Mohammad Zaka-ur-Rab, Muslim University, Aligarh (U.P.), India.

Thanks were voted to donors of gifts to the Library since the last meeting.

Miss D. Linscott, Mr. R. S. George, Mr. E. C. Harris, Mr. I. A. Morrison and Mr. S. A. Richardson signed the Obligation Book and were admitted Fellows of the Society.

The President exhibited examples of moths, their parasites and hyperparasites and commented on the dry weights of representative adults of the species concerned. The efficiency with which animals convert their food into the substance of their own bodies during growth is variable, but seldom rises above 30 per cent., with 70 per cent. lost as waste matter. Thus an adult common quaker moth (*Orthosia stabilis* (Schiff.)) (dry) may weigh about 25 mg. Its ichneumonid parasite *Dusona* (= *Campoplex auctt.*) *cultrator* (Grav.), which kills the host prepupa, weighs only 8 mg. as an adult. However, the hyperparasite *Cidaphus alarius* (Grav.) which is an endoparasite of *Dusona* and which it kills after the *Dusona* larva has spun its cocoon, has a dry weight as high as 6 mg., suggesting an efficiency of metabolic conversion of about 75 per cent. ! The hyperparasite is not obviously smaller than the *Dusona*, and this has often led to such hyperparasites being mistaken for primary parasites.

Similarly the dry weight of winter moth, *Operophtera brumata* L., is about 7 mg. Its primary parasite, the tachinid *Cyzenis albicans* Fallén, weighs about 1.2 mg. when killed before feeding and dried. *Phygadeuon dumetorum* Grav. attacks the newly formed puparia of *Cyzenis* and its dry weight seems to be as high as 0.7 mg., suggesting an efficiency of conversion of about 60 per cent.

The biochemical basis for these very high apparent rates of conversion by hyperparasites is unknown.

Mr. J. D. Bletchly gave a paper on the effect of a sub-lethal dosage of gamma radiation on a population of *Lyctus brunneus* Stephens (Coleoptera: Lyctidae), an abstract of which appeared on page 5.

The discussion which followed was opened by the President, who asked whether any mutations caused by gamma radiation had been observed. Mr. Bletchly replied that there was a very obvious effect on the elytra, one of which might be shorter than the other; the proportion of abnormal elytra was markedly higher in treated than in untreated beetles. This might be a mutation.

Dr. A. M. Easton then asked whether the wings and capability of flight were also affected, to which Mr. Bletchly replied that no information had been obtained, largely because dispersal by flight did not appear to be important in the death watch beetle, the control of which was the most important object of these investigations.

In reply to an enquiry as to the effect of the treatment on length of adult life, Mr. Bletchly said that this was short in *Lyctus* and *Anobium* under normal circumstances. The death watch beetle (*Xestobium*), however, overwinters as an adult. The effect of irradiating *Xestobium* adults at different stages had been examined and little difference was noted, which was surprising, as the reproductive organs were maturing during hibernation. The length of life of these adults did not appear to be greatly affected by radiation.

Dr. N. E. Hickin asked whether the use of natural predators and parasites was being investigated; he added that Becker claimed complete control in some cases with *Spathius exarator* L. and outbreaks of Anobiids were successfully controlled by a species of Clerid beetle. Mr. Bletchly replied that predatory mites had eradicated cultures on many occasions but in general he had not observed that parasites and predators exercise significant control of wood-boring insects.

Mr. S. A. Richardson suggested that *Stegobium paniceum* L., which was closer to *Anobium*, might be used in screening tests, to which Mr. Bletchly replied that the effects of irradiation had been studied on *Anobium* and *Xestobium*, and considerable data were available. The dosages required were rather similar and there seemed to be no real need to experiment further with *Stegobium*.

Mr. E. C. Harris gave a paper on the value of fumigation for the control of wood-boring insects, an abstract of which appeared on page 6.

The President said that what had impressed him most was the extreme difficulty of

devising proper methods of testing the effects of fumigation because of the inaccessibility of wood-boring beetles. It was clearly a case in which the economic importance of the problem had provided the stimulus for work which would not otherwise be considered feasible. He asked whether there was any scheme on a commercial scale for the protection of sound wood. Mr. Bletchly replied that there were no compulsory control measures or preservative treatments against infestation in this country except in certain areas of Surrey. This was probably partly due to absence of any British Standard tests for preservatives against wood-boring insects. The British Standards Institute was considering this matter for it might be advisable to introduce compulsory measures in the future because of the higher proportion of sap-wood being used in modern roof construction.

Dr. Hickin asked whether it was known if adults of *Corynetes coeruleus* Deg. needed to eat adults of the death watch beetle before egg-laying. Mr. Harris replied that this had not been observed in the laboratory but dead *Xestobium* in buildings were often found showing signs of attack by Clerids.

An enquiry was made as to whether any data were available on fumigation by methyl bromide in the case of species other than those mentioned, and, if not, whether there was any likelihood of such work being undertaken by any other body if the Forest Products Laboratory did not contemplate it. Mr. Harris said nothing was contemplated at present but the investigations might be extended eventually. The enquirer continued that he was particularly interested in the Bostrychidae and Platypodidae, which infest soft woods in the tropics and are a problem in soft wood crates used for export. Mr. Harris said that the West African Timber Borer Research Unit was more closely concerned with this problem and had produced satisfactory recommendations for prevention of ambrosia beetle attack by the use of contact insecticides.

The President asked if there was any possibility that Clerids could eat larvae killed by fumigation, to account for their sudden increase. Mr. Harris agreed that this was possible although the point had not been investigated.

Dr. Easton observed that if there was an abundance of *Xestobium* the Clerids would not need to emerge, which Mr. Harris agreed was again just possible; but he thought it was more likely they would be forced to pupate earlier by lack of food after fumigation and thus cause a sudden increase in the adult emergence.

Mr. Richardson said he questioned the value of detailed investigation on fumigation and felt it was better to concentrate on the reason for the infestation in the first place. The death watch beetle was always associated with fungus and steps should be taken to eradicate this. No fumigant could be certain of 100 per cent. success and a few adults emerging after fumigation could produce larvae and lead to re-infestation.

Mr. Harris said that most of the work to which he was referring was done in H.M.S. Victory and fumigation treatment was most appropriate for the interior timbers, but Mr. Richardson maintained there must be some beetles on the outside. Mr. Harris pointed out that the actual decay was internal and originally caused by a fungus found in damp oak; the external surfaces were quite dry. H.M.S. Victory is sheathed in copper up to the water line, and although the beetles will emerge through dry wood and even through some metals, they had not been observed to emerge through copper.

PAUL FREEMAN, *Honorary Secretary.*